

INVERTEBRATE SURVEYS MANUAL

The invertebrate surveys will give MCP an overview of the abundance of invertebrates at different depths at different dive sites. Combined with fish and substrate surveys the health of the reef can be monitored.

HOW DOES IT WORK?

Your training for surveys

To be able to carry out the surveys correctly, it is important that you learn to identify and find the different invertebrate species that we monitor. To do so, you will go through a phase of in-water and out-of-water training with an experienced teacher (*staff member, intern or trained volunteer*).

- **Bootcamp** : (2 dives) Buoyancy practice and general scuba skills training.
- **Introduction to coral reef monitoring:** (1 presentation and 2 dives) One day to be introduced to general reef species identification, our survey methodology and practice required skills (reeling, navigation, etc.)
- **Identification training:** (2 presentations, 4 dives, 1 test)
 - Two days to learn our list of monitored species with presentations in the morning, followed by 2 identification dives and a quiz in the afternoon.
 - During an identification dive, your teacher will bring a

slate with the names of the invertebrates you were presented in the morning. In the beginning, the teacher will point at an invertebrate and show you on the slate which it is. You will soon become more knowledgeable and be challenged to identify them yourself.

- To assist your training it is highly encouraged that you use part of your afternoons for studying. Your teacher will introduce you to different training tools to help you study independently (Power point presentations, anki-decks, flashcards). **Study them !** The quicker you learn the invertebrates, the more fun your dives will become and you can begin on surveys!
- At the end of this first phase of training, you will be asked to go through an Identification Test (dry). Passing rate is 90%. Once you have mastered theory, you will begin to do transect practices.
- **Invertebrates Transect Practice** : (Minimum 4 dives, 1 underwater test)
 - You will learn to do surveys by conducting transect practices counting invertebrates 2.5 meters away from one side of the reel (Deep/Shallow). Your teacher will count the invertebrates in the same area. You and your teacher will then compare underwater what you have found. Your teacher will then go back and show you what you might have missed, this will give you a better understanding of where to spot certain invertebrates.

- Once you and your teacher feel that you are prepared you will be tested. You must complete and pass a mock survey test with a designated staff member. You will be assessed on your ability to identify and find the invertebrates following the correct methodology in a certain amount of time.
- Training your eyes to be able to spot invertebrates takes a bit of time, do not feel discouraged, you will get it !

**It is very important in Scientific Research that the data collection process is conducted systemically showing little differences between each volunteer. This is something that MCP takes seriously; thus, please don't feel offended if you are asked to practice a bit longer. As a volunteer, presumably learning invertebrates for the first time, it can take a few dives to learn the different species. Everyone learns at different rates and you will be given as much time and support as needed to reach the level required to collect reliable data.

On top of that, your dive skills also need to be sufficient to ensure both the safety of the reef and yourself. If it turns out that you have a lot of trouble with swimming upside down, frog kicking and/or keeping your foot up at all times, we'll ask you to do some extra buoyancy practice or join another boot camp. We want to prevent harming the coral while doing research as much as possible. If someone were to accidentally kick a piece of coral and it breaks off, it could take 2-10 years to regrow, depending on the species of coral. This is another aspect that MCP takes very seriously, so again, please don't be offended if we ask you to take a little

more time to work on your dive skills; we are committed to working with you to make you a better diver. At the end of the day it will make diving for you easier and more enjoyable.

Your survey material

- 30 meter reel
- Two invertebrate slates per team
- 2 Pencil and at least 1 spare pencil per team
- An eraser in the car
- Invertebrate book

The surveys methodology :

- The surveys takes place **in a buddy pair** along a **30m transect line** over **continuous reef** within a depth range that will be given to you (3-7, 9-13 or 15-19 meter deep).
- After you are given a dive briefing, you will be asked to lay out your reel in a random location of the reef within the depth range you were given. It is very important that you perform your survey over continuous reef and that you make sure that you are at least 15 meters away from any other survey reels.
- To perform a survey, you follow the transect line and together with your buddy. Each diver will choose one side of the line and will cover 2.5m¹ on their side of the transect line. *(One diver looks at the inverts at one side*

¹ It is important that you're accurate in estimating how long 2.5m is. If you consequently survey 3m width instead of 2.5m you see a lot more animals and the data is not comparable anymore.

of the transect line, while the other diver observes the other side of the line totalling 5m together)

- To cover the biggest area, you swim in a **zigzag pattern** or S-shaped pattern from the transect line to the imaginary 2.5m line and back. It is easiest to swim with your face down and your feet up. This enables you to look under ledges, coral heads and in crevasses while preventing your feet from hitting the coral. Some of the invertebrates are easy to overlook if you don't search properly. They are well hidden and don't like to show themselves, like coral banded shrimps and octopus. Try to swim as slowly as possible to make sure you don't miss any invertebrates.
- Just like any dive, stay close to your buddy so you can respond quickly should an emergency occur. It is also convenient if you need help identifying anything or want to share something amazing you just spotted with your buddy!
- Depending on your air consumption and the depth you will be at, you will be able to perform more than one survey in one dive. You can finish a survey on the second dive if you are not done with it, but a 30 m survey must be completed the same day, it cannot be divided into two days.
- Depending on the depth of the transect and the dive location, the number of invertebrates you encounter can be different, therefore your dive time can differ as well. The shallow transects usually have more

invertebrates compared to the deeper transects and some dive sites can have a very high number of invertebrates. As a rule of thumb, take at least 15 minutes for a 30m stretch of transect.

A few things to keep in mind:

- Make sure to check your air regularly. Let your buddy know after each 30m transect how much air you have left. You might have the feeling your overdoing it a bit in checking your air, but we notice that a lot of volunteers forget to check their air while they are doing research. Just like any dive, stay close to your buddy so you can respond quickly should an emergency occur.
- When assigned to the deeper transects, make sure to do a safety stop. If you are down to 60 bar and you are not finished, abort the rest of the survey. **Don't start rushing to finish it**, because you will be overlooking invertebrates and could endanger yourself by getting to low on air. Do a safety stop and surface.
- If a person has an emergency/is not feeling well, abort the survey. Surface together as a buddy team and ask help from another team if necessary. If it turns out to be a minor problem and you both have enough air, you can continue the survey.
- **SAFETY COMES FIRST!**

Data entry

Once you have finished your diving, you will enter your data in the database. Your teacher or an experienced volunteer will explain to you how that works. Make sure you enter your data accurately. If you make any mistakes, it is almost impossible to correct them later, as you will need to erase the data on your slate for the next survey. After you have entered the data, go over it again and compare the data from the data sheet with your slate. Please enter the data the same afternoon and don't wait until the next day, as it is easy to forget and this often results in lost data.

What do we do with the data?

MCP is interested in the health of the coral reef. Changes on the reef occur slowly and often take several years. Because the monitoring is long term, we will be able to monitor the health of the reef over several years and notice any incline or decline in health. The long term monitoring program is especially useful if an anthropogenic (human) threat or natural disaster takes place. Hopefully it doesn't happen, but if a typhoon occurs we can show data about the recovery of the reef and compare it to its previous state. We can also monitor the influences of human impact and report our findings to the authorities, such as when oil is dumped into a river that empties into the ocean next to a dive site etc.

The data is also used for designing the Coastal Resource Management plan of Zamboanguita. The municipality would like to have data about the Marine Protected Areas (MPA's)

within the municipality (Basak, Lutoban Pier, Lutoban South and Dalakit). The same goes for the municipality of Siaton (Andulay). For the past few years discussions have taken place about the possibility of turning Kookoo's Nest into an MPA. MCP is assisting this process by collecting long term monitoring data to help convince people this is an important area for conservation.

Invertebrate data is especially interesting for the Lutoban MPA's. The intertidal zone of the MPA is now a buffer zone, meaning that gleaning (collecting invertebrates for food) is still allowed. Once we have enough data, we can advise the municipality in partially closing the gleaning area during spawning season of important invertebrates or temporarily close the collecting invertebrate species which are getting really low in numbers or for other reasons.

Other organizations are also interested in the data like BFAR (Bureau of Fisheries Management and Agricultural Resources), DENR (Department of Environmental and Natural Resources), and other NGO's.

The marine research department of Silliman University (SUAKCREM) in Dumaguete is interested in giant clams, because clams are heavily overfished in the Philippines. They have set up a breeding project at Camiguin Island with Australian clams. SUAKCREM would like to know how many 'native' giant clams are still left in this area.

